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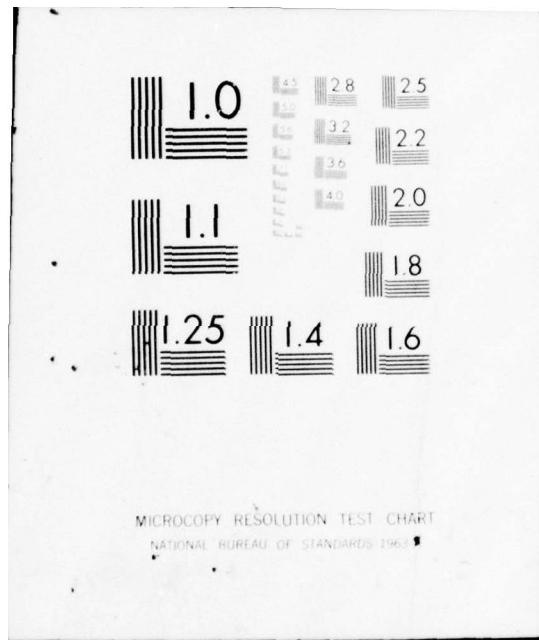
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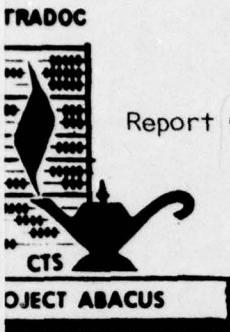
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CTS

PROJECT ABACUS

Report CTD - TR - 76 - 5

FOURTH YEAR STATUS REPORT
COMPUTERIZED TRAINING SYSTEMS PROJECT
PROJECT ABACUS

Donald A. Kimberlin

Test Branch
Communicative Technology Directorate
US Army Training Support Center
Fort Gordon, Georgia 30905

1 August 1976

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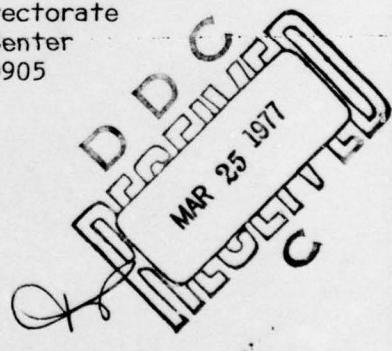
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Prepared for:
US ARMY TRAINING AND DOCTRINE COMMAND
Fort Monroe, Virginia 23651

SOLDIER COMMUNICATORS
FORT GORDON
HOME OF THE SIGNAL CORPS
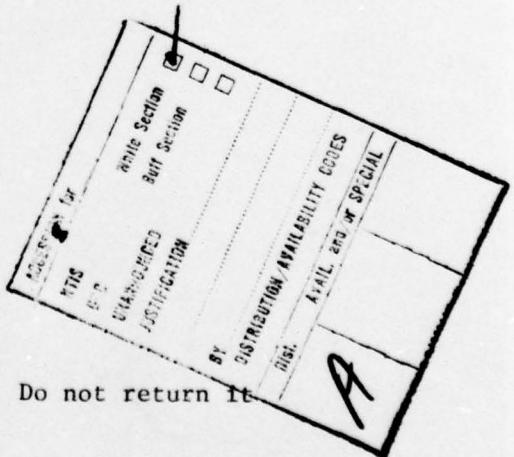
REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CTD - TR - 76-5	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Fourth Year Status Report. Computerized Training Systems Project. Project ABACUS.		5. TYPE OF REPORT & PERIOD COVERED Technical Report.
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7. AUTHOR(s) Donald A. Kimberlin		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Training Support Center Communicative Technology Directorate, Test Branch Fort Gordon, Georgia 30905		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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		13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS(If different from Controlling Office) Headquarters US Army Training and Doctrine Command Fort Monroe, Virginia 23651		15. SECURITY CLASS. (of this report) UNCLASSIFIED
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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

1. Instructional Strategies	6. Training
2. Instructional Models	7. Military Training
3. Training Technology	8. Computer Assisted Instruction
4. Educational Technology	9. Computer Managed Instruction
5. Curriculum Development	10. Self-Paced Training

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report covers the actions which have transpired during the fourth year of Project ABACUS, the Army's program for the development of a Computerized Training System. It includes a narrative summary, key documents, and amplifying annexes. As a historical document, it will be utilized in preparation of the final project report. It is also meant to provide the current reader with an understanding of how the project has moved to its present position, and what actions are anticipated to be completed in the near future.

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FOREWORD

This report covers the actions that have transpired during the fourth
year of Project ABACUS, the Army's program for the development of a
prototype Computerized Training System. It includes a narrative
summary, key documents, and amplifying annexes.

As a historical document, it will be utilized in preparation of the
final project report. It is also meant to provide the current reader
with an understanding of the progress to date of Project ABACUS, its
present position, and what actions are anticipated to be completed in
the near future.
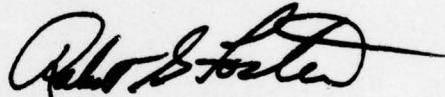
ROBERT G. FOSTER
LTC, SigC
Program Director, Project ABACUS

TABLE OF CONTENTS

I.   INTRODUCTION

The mission of Project ABACUS is to design, develop, test and evaluate
a 128-terminal Computerized Training System (CTS), utilizing the multi-
minicomputer concept. At the conclusion of four years, the project is
moving into the test and evaluation phase.

II.   BACKGROUND

The events leading to the implementation of the CTS project and the
project progress through the first three years are documented in CTS
Report TR-73-4 "One Year Status Report, Computerized Training System
Project, Project ABACUS" dated 1 August 1973, CTS Report TR-74-4
"Second Year Status Report, Computerized Training System Project,
Project ABACUS" dated 1 August 1974, and CTSD Report TR-75-4 "Third
Year Status Report, Computerized Training System Project, Project
ABACUS" dated 1 August 1975.

The Product Manager Charter was reviewed as required on the project's
anniversary date, 1 August 1975. There were no changes made in the
document. The DA Management Plan required the following changes:
(1), The US Army Signal Center and School (USASCS) was consolidated
with the US Army Southeastern Signal School (USASESS) at Fort Gordon,
Georgia, under the name US Army Signal School (USASIGS). USASIGS
continues to be a primary contributor to the project; and (2), the
Steering Advisory Group (SAG) was discontinued and its responsibil-
ities were assumed by TRADOC (Annex A).

The Memorandum of Understanding (MOU) between the Product Manager
(PM) and the Commandant, United States Army Signal School (USASIGS)
is being studied since the project is approaching its final phase.
Planning is on-going relative to future actions relating to computer
applications to training in general and Project ABACUS in the specific.

III.   PERSONNEL AND ORGANIZATION

The consolidation of several training support elements into the
US Army Training Support Activity (TSA) resulted in the organization
of the US Army Training Support Center (TSC), Fort Eustis, Virginia,
with BG Corley Wright as Commander, and COL G.B. Howard as Deputy
Commander. COL Howard continues as Product Manager, Computerized
Training Systems Project ABACUS. LTC Robert G. Foster is the Program
Director and Contracting Officer's Technical Representative (COTR),
Project ABACUS, Fort Gordon, Georgia. Mr. Donald Kimberlin is the
Chief, Test Branch and Alternate COTR for Project ABACUS. He is the
COTR for the Human Resources Research Organization (HumRRO) contract

to provide the acceptance test evaluations of the Project ABACUS computer system. The present organizational relationships are shown at Annex B.

The staffing of Project ABACUS, Fort Gordon, Georgia, consists of eleven military and five civilians. A roster of personnel is at Annex C. The organizational relationship between USASIGS and Project ABACUS is at Annex D.

IV. COMPUTER SYSTEM

A. Summary of Procurement. The following is a summary of the major procurement actions that have been completed prior to and during the fourth year of the project. The actions described in paragraphs 5, 6 and 7 are the result of modification changes to the original CTS contract with GTE-Sylvania and were brought about by the Project ABACUS move to USASIGS, Fort Gordon, Georgia. The procurements cited under paragraphs 8, 11 and 12 are for normal system maintenance. Paragraphs 9 and 10 cite procurements required to upgrade the system.

1. April 1973 - Request for a Proposal was issued to industry.

2. December 1973 - GTE-Sylvania, Inc., was awarded the contract.

3. April 1974 - Initial computer system was delivered to the Office of the Product Manager.

4. July 1974 - Initial 32-terminal display controller was delivered to the US Army Signal School (USASIGS).

5. May 1975 - Full, six processor multiminicomputer system was delivered and installed, including sixteen terminals. One hundred and twelve terminals were placed in local storage.

6. June 1975 - Communications study was completed.

7. July 1975 - Communication and cabling contract negotiations were conducted.

8. July 1975 - FY76 maintenance of CTS contract negotiations were conducted.

9. February 1976 - Alphanumeric system terminal was purchased.

10. February 1976 - Communications installation completed and full 128-terminal system installed.

11. February 1976 - Operating system RSX-11D, version 6B, was purchased.

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12. June 1976 - FY7T and FY77 maintenance contract negotiations were conducted.

13. June 1976 - Maintenance spares for the Project ABACUS system were purchased.

B. Status.

1. The installation of the 128-terminal system was completed in February 1976. At the completion of the installation, the first of three attempts to run the Phase III Acceptance Test was made. The first test was started on 23 February 1976 but terminated on 25 February 1976 due to failure of the system to perform under normal load. The test was rerun starting 22 March 1976, and again halted when it became apparent that the system could not meet the required level of performance. The third run of the Phase III Acceptance Test was made during the period of 19-30 July 1976. This test was completed but major problems and discrepancies were found. At the time of the preparation of this report, GTE-Sylvania, the contractor, is working to resolve these problems and discrepanices.

2. The original operating software system, RSX-11D, version 4A, was replaced by RSX-11D, version 6B. The updated version has a much improved file handling design that plays a significant role in alleviating some of the data traffic problems uncovered during the acceptance tests.

3. A fixed fee maintenance contract was negotiated to cover the FY7T period and the first quarter of FY77. The current status of the computer system contract is at Annex E.

V. COURSE DEVELOPMENT.

A. Current Status. Course development progressed in an uneven manner. The Field Radio Repair Course, MOS 31E20, is at the point where it can be validated with students, and implemented. The Avionics Communications Equipment Repair Course, MOS 35L20, is approaching the same stage of preparation. The Teletypewriter Equipment Repair Course, MOS 31J20, requires a significant amount of work before it is ready for implementation. The current status of course development is at Annex E.

B. Problems Encountered.

1. The significant factor affecting the progress of the 31E20 MOS course was the unavailability of the computer system to test, debug, and validate the lesson material.

2. The lack of system time was an important factor in the progress of the 35L20 course although not as critical. This course has progressed into lesson development to the extent where computer time is needed, however, work can continue without system time.

3. The 31J20 MOS course still requires a quantity of writing, coding, and review that does not require computer time. At present, the lack of computer time is more of an inconvenience and motivational factor than a major necessity.

4. A continuing problem affecting course development for each of the three courses is personnel turbulance. This was caused by tranfers of individuals to other activities, promotions, retirements and expirations of term of service. All of the personnel originally assigned by USASIGS to the project were replaced at least once. In the case of military personnel, some task groups were replaced twice. The 35L20 MOS course was most severely affected by the shifting of personnel. It is to be noted that personnel turbulance is endemic to the operational military environment and it must be reckoned with as a matter of reality.

C. Delays in Course Implementation.

1. The most significant cause for the delay in course implementation was the system's failure to meet the required standards to pass the acceptance test. Additionally, instability in the Program of Instruction (POI) in the 31E20 and 31J20 MOS courses caused still further delays, particularly in the latter course. It is anticipated that any long range military training project will be affected by POI changes because of new equipment and changing requirements/doctrines.

2. Rather than establish dates when the courses will be implemented, a schedule was prepared predicated upon the date of the acceptance of the system by the government. Dates in the schedule are expressed as a N number of days from D-day, where D-day is the date of the acceptance of the system by the government. The implementation schedule is as follows:

Course	Implementation
31E20	D + 90
35L30	D + 150
31J20	D + 180

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VI. SYSTEMS AND APPLICATIONS PROGRAMMING

A. Progress.

1. The systems and applications programming progressed satis-factorily, but as with the course development effort, became stymied by the failure of the system to perform up to the requirements. Many of the applications programs interface with the courseware, interchanging data elements. It is necessary that the courseware which generates these data elements be completed in order for the applications software to be debugged and the two integrated into a unified system. To complicate matters some, two experienced members of the programming staff will be lost to the project at the end of their enlistments, one in August and the other in September 1976. At this point in time, replacements would be of little value due to the short time left until completion of the project and the long time required to bring replacements aboard and up to speed.

2. On the positive side, the applications programming effort progressed to the point where final debugging and interfacing with the courseware can be accomplished in D+30 days. Once the first course is completed, the remaining two courses should cause no problems inasmuch as their interface requirements are nearly identical.

B. Current Status. The current status of the programming effort is at Annex E.

VII. PROJECT EVALUATION

A. Course Validation and Conversion. Course validation and con-version to use of computers in the training of students in the three courses will commence as follows:

1. Field Radio Repair Course, MOS 31E20, D+90 days.

2. Avionic Communication Equipment Repair Course, MOS 35L20, D+150 days.

3. Teletypewriter Equipment Repair Course, MOS 31J20, D+180 days.

B. Course Implementation. The Field Radio Repair Course, MOS 31E20, was converted to the new Program of Instruction (POI) on 23 August 1976. The Teletypewriter Equipment Repair Course, MOS 31J20, will have a POI change. Additional academic training time on basic electronics subjects and other changes are to be implemented prior to using the computerized training system, in the 31J20 course.

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C. Data Collection Problems. All three courses in Project ABACUS are in a dynamic situation and changes must be expected in the POIs. This caused problems in accumulating data for making comparative studies. Due to the delay problems in the acceptance tests and with the Field Radio Repair Course, MOS 31E20, proceeding with the implementation of its new POI, it is hoped that more valid data can be collected for comparative studies.

D. Required Time for Course Conversion. Many questions arose on how much time it takes to convert self-paced instructional materials to CMI/CAI type of instructional materials. An analysis of time sheets was made for the period May 1974-July 1976 (Annex F).

1. As of July 1976, the three courses had 1745 POI academic hours instruction on equipments. POI academic hours were converted to lesson units for use with the computerized training system (Project ABACUS).

2. It is more advantageous to study the 31E data more closely than 31J or 35L. The 31E data is perhaps the most valid. The 31J and 35L had numerous POI and personnel changes and they should be considered as the most unstable of the courses. The 31J and 35L courses started the input of their lesson material on the computer system significantly later than the 31E course. This is reflected in the lower quantity of lesson material stored in the data base. It also should be considered that personnel developing these CMI/CAI materials were inexperienced with the use of computers and the computer system itself was undergoing tests many times when an instructional programmer (course writer) was attempting to input training materials.

E. Instructor Attitudes. A survey on instructor attitudes on self-paced instruction was completed in April 1976, within the three courses in Project ABACUS. A summary of findings is at Annex G. A copy of the survey is at Annex H.

VIII. CONCLUSION

In retrospect, this past year saw several major events occur that adversely affected the progress of this project. These events included the installation of the communications cables between the computer in Moran Hall and the terminals in Moran, Brant, and Greely Halls. This cable installation was necessitated by the move of the project from Fort Monmouth, New Jersey, to Fort Gordon, Georgia, which consolidated the two schools. Another significant event delaying the project was the failure of the system to meet criteria during three trials of the Phase III Acceptance Test. And finally based on the course development progress to date, there is the question whether all of the courses would have been ready for implementation had

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the system passed the Phase III Acceptance Test. The instability of the 31J20 course Program of Instruction (POI) was at times a contributing factor in the sluggish course development. The 35L20 course was affected by personnel turbulance to a greater extent than the other two courses. On the positive side, the full system was installed, with its attendant communications; the contractor is working to correct the problems and deficiencies; the course development progressed to where at least one course is immediately ready for validation and implementation; and the application programming is in its final debugging phase.

The year ended on a high note with current actions programming smoothly and plans for future experiments shaping up favorably.

ANNEX A

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR PERSONNEL
WASHINGTON, D.C. 20310

29 JUN 1976

DAPE-MPT

SUBJECT: Computerized Training System (CTS) Project

Commander
U.S. Army Training and Doctrine Command
ATTN: ATTNG-TA-TS
Fort Monroe, Virginia 23651

1. References:

   a. DACS-DIP letter, 1 August 1975, subject as above.

   b. TRADOC letter, ATTNG-TA-TS, 29 August 1975, subject as above.

2. The purpose of this letter is to formally transfer responsibility for the CTS Project Steering Advisory Group (SAG) from the Department of the Army (DA) to TRADOC, effective 30 June 1976. SAG responsibility for the prototype testing does not include approval for any extension of the system beyond the prototype efforts.

3. Concerns expressed previously (ref a) remain. Funding approval for additional CTS effort is contingent on (a) addition of significant elements of CAI to the system, and (b) preparation of a comprehensive evaluation which demonstrates not only feasibility, but also cost effectiveness. Request that upon completion of prototype test you provide DA Headquarters with a final report/recommendations.

FOR THE DEPUTY CHIEF OF STAFF FOR PERSONNEL:

P. R. KINNEY
Colonel, GS
Chief, Training
Division

A-1

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                    ┌──────────────────────┐
                    │ Commander            │
                    │ US Army Tng Spt Ctr  │
                    └──────────┬───────────┘
                    ┌──────────┴───────────┐
                    │ Director             │
                    │ Communicative        │
                    │ Technology           │
                    │ Directorate          │
                    └──────────┬───────────┘
          ┌────────────────────┼────────────────────┐
┌─────────┴─────────┐ ┌────────┴─────────┐ ┌─────────┴──────────┐
│ Product Manager   │ │ Chief            │ │ Chief              │
│ ARTADS            │ │ Systems Design   │ │ Training Analysis  │
│                   │ │ Div              │ │ Div                │
└───────────────────┘ └────────┬─────────┘ └────────────────────┘
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          ┌─────────┴─────────┐   ┌─────────┴─────────┐
          │ Chief             │   │ Chief             │
          │ Development       │   │ Test Branch       │
          │ Branch            │   │                 * │
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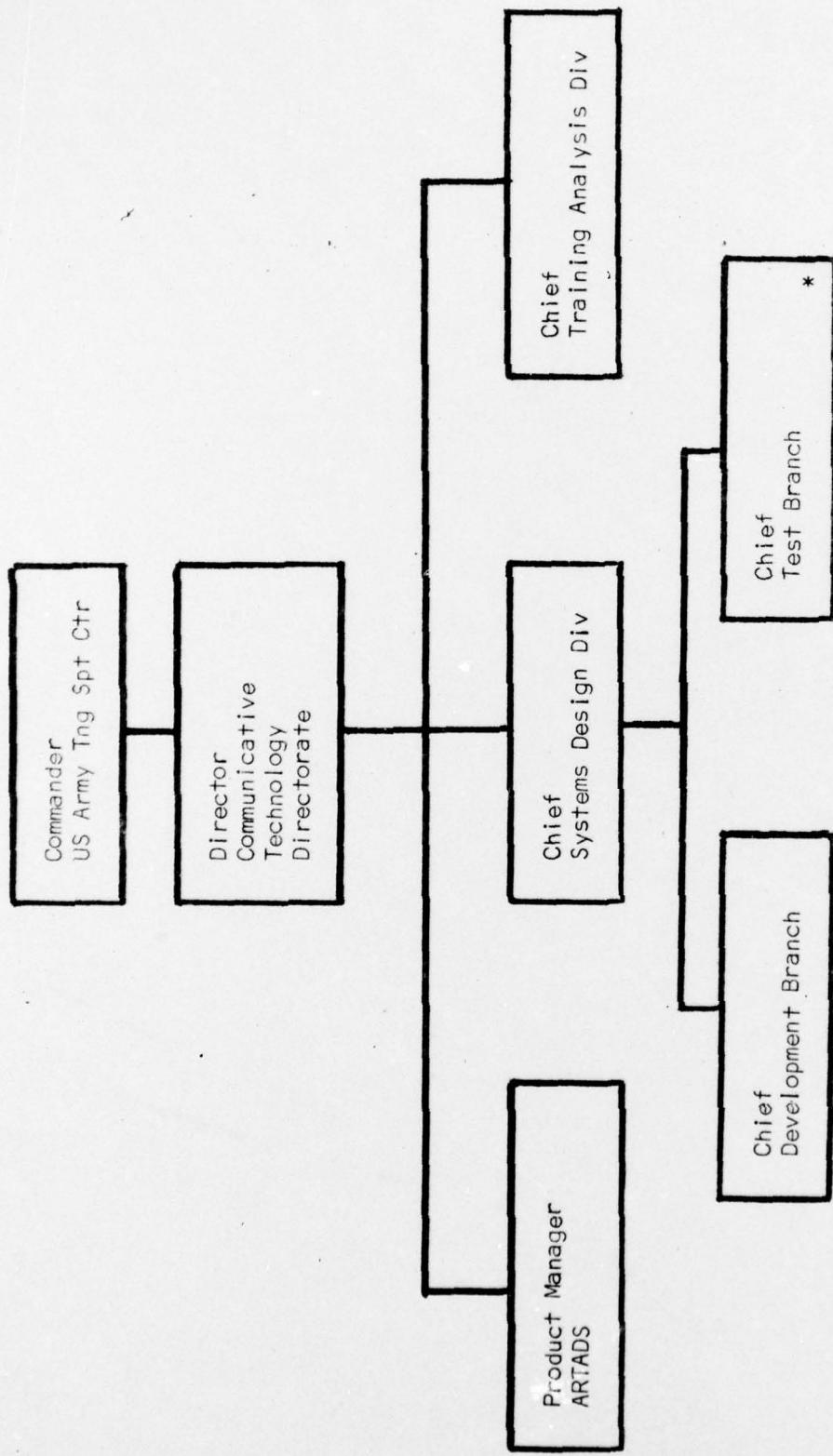
*TSC TDA with duty Project ABACUS, Fort Gordon, GA

ANNEX C

PERSONNEL ROSTER - PROJECT ABACUS

Name	Rank/ Grade	Job Title	Duty Dates		
			1 Aug 75	1 Jan 76	31 Jul 76
FOSTER, ROBERT G.	LTC	Prog Dir			
KIMBERLIN, DONALD A.	GS-13	Chief, Test Branch			
HARTMAN, LARRY K.	CPT	ADP Off			
WICKERT, DAVID A.	2LT	ADP Off			
HAINES, BURZELOUS E.	GS-12	Ed Spec			
MUSSELWHITE, HARRY A.	GS-12	Ed Spec			
ALTMAN, BRYAN D.	GS-11	Ed Spec			
LAMB, JANET M.	GS-11	Ed Spec			
BROWN, DONALD L.	SFC	Instr Prog			
DIXON, JOHN W. JR.	SFC	Instr Prog			
HOOKER, BERNARD L.	SFC	Instr Prog			
STOTTS, JAMES D.	SSG	Admin NCO			
DUNCAN, WILLIAM L.	SP5	Programmer			
HUTSKO, GARRETT L.	SP5	Programmer			
MALCOLM, VARA G.	SP5	Programmer			
MASHEY, JOEL A.	SP4	Programmer			
PEAK, EDWIN R. III	SP4	Programmer			
ZARSKY, DAVID J.	SP4	Programmer			
JANTZEN, RAILI A.	GS-4	Clerk			

ANNEX D

OPERATIONAL TEST AND EVALUATION
ORGANIZATIONAL RELATIONSHIPS
USASIGS/CTS

Program Director
Project ABACUS

Evaluation

System Analysis
and
Programming

Instructional
Technology

Task Group Leader
USASIGS

MOS Courses

System
Operation

——————— Command and Control
——X——X—— Monitor and Coordinate
— — — — — Technical Advice
—·—·—·— Augments USASIGS course development
teams. Task Gp Leader exercises
operational control.

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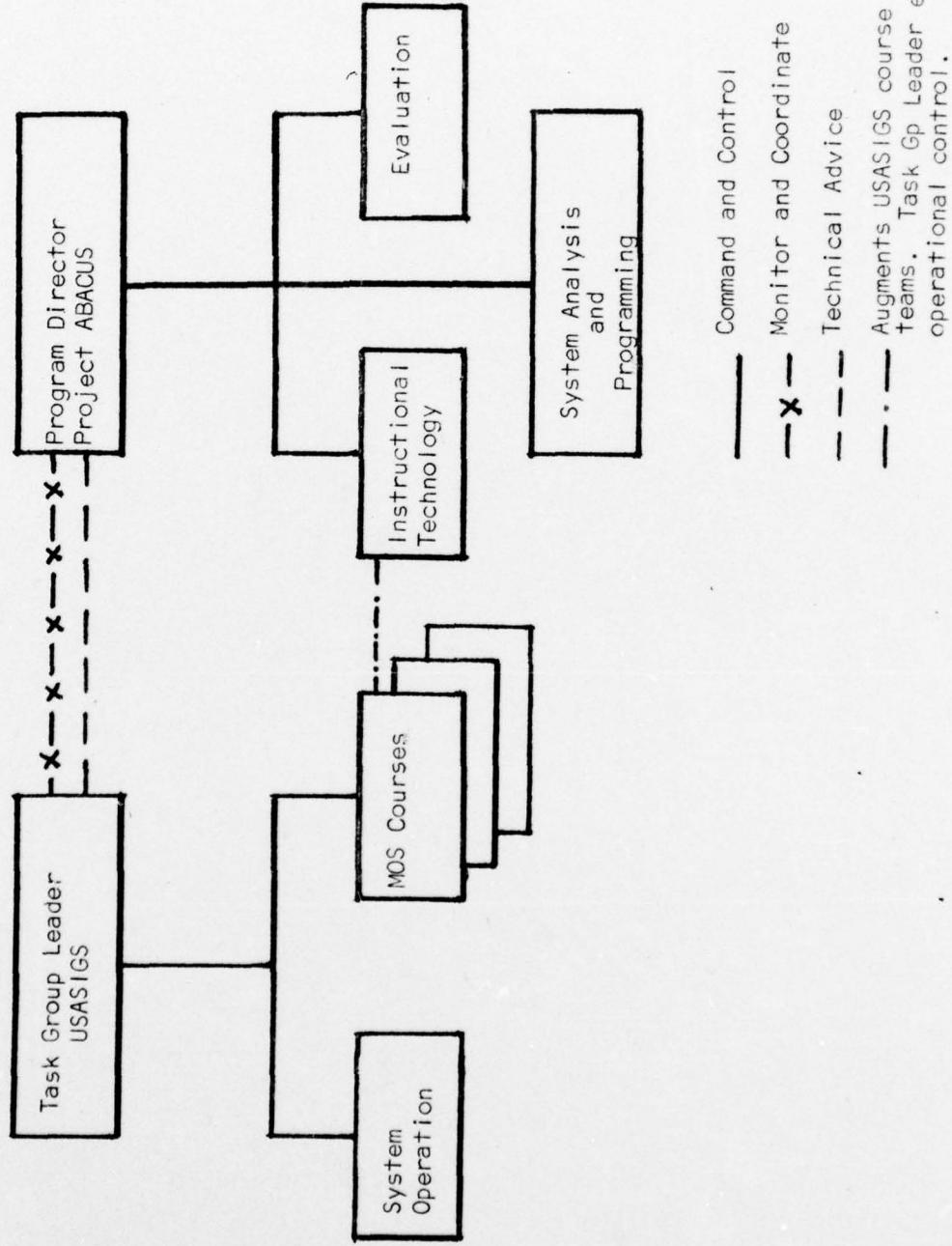
MONTHLY STATUS REPORT—PROJECT ABACUS

Description	Item	Completion Date		Remarks
		Scheduled	Actual	
Initial Subsystem	0001AA	Apr 74	May 74	
Display Control Subsystem	0001AB	Jul 74		
Other Hardware and Peripherals				
for Complete System	0001AC	Jan 75	Apr 75	
Software for 0001AA	0002AA	Apr 74	May 74	
Software for 0001AB	0002AB	Jul 74	Oct 74	
Complete Software w/Class I	0002AC	Jan 75	Apr 75	
Class I Training Course	0003AB	Jan 75	Jul 75	
Systems Training Course	0003AC	Jan 75	Jul 75	
Technical Data				
Administrative Management	0005AA	Oct 75	Nov 75	
Engineering and Configuration	0005AB	Oct 75	Nov 75	
Financial	0005AC	Oct 75	Nov 75	
Human Factors	0005AD	Oct 75	Oct 75	
Technical Publications	0005AE	Oct 75	Nov 75	
Procurement/Productions	0005AF	Oct 75	Nov 75	
System/Subsystem Analysis	0005AG	Oct 75		
Test	0005AH	Oct 75		
Disk Drive RK05-AA	0007	Apr 75	Apr 75	
Communications Study	0006	May 75	Jun 75	
Acceptance Test (AT)				
Phase I		Sep 74	Oct 75	Hardware accepted 24 Oct 75.
Phase II		Apr 75	Apr 75	
Phase III		Nov 75		Phase III AT failed; levels 2 and 5 to complete.
Communications Installation	P00008	Nov 75	25 Feb 76	Contract Modification.
Maintenance Contract	P00009	1 Jul 75	30 Jun 76	Contract Modification Completed.
Maintenance Contract	P00010	1 Jul 76	31 Dec 76*	Contract Modification.
Fund Citation Change	P00011			Administrative Actions.
FY7T and 1st Qtr FY77 Maintenance	P00012	1 Jul 76	31 Dec 76*	
Fund Citation, FY7T	P00013			Administrative Actions.

*Termination Date for Maintenance.

MONTHLY STATUS REPORT—PROJECT ABACUS

Description	Program ID	Start Date	Start Leader*	% Complete	Completion Scheduled	Completion Actual	Remarks
COURSE DEVELOPMENT:							
Written	31E	Feb 74	C. Lewis	100	No interim dates		USASIGS responsibility; CTS augments.
	31J	"	R. Bury	93	"		
	35L	"	H. Duke	98**	"		
Reviewed, Off Line	31E	"		100	"		
	31J	"		56			
	35L	"		66			
Coded	31E	"		100			
	31J	"		65			
	35L	"		98**			
Stored, on data base	31E	Jun 75		97	15 Feb 76		
	31J	"		3	15 Apr 76		
	35L	"		22**	15 May 76		
Validation	31E	15 Feb 76		0	1 Jun 76		These dates to be readjusted relative to system acceptance date.
	31J	15 Apr 76		0	1 Sep 76		
	35L	15 May 76		0	1 Sep 76		
Convert to CTS	31E	1 Apr 76		0	1 Sep 76		*USASIGS Task Leader
	31J	1 Jun 76		0	1 Sep 76		**Realigned and sub-divided units.
	35L	1 Jul 76		0	1 Sep 76		

MONTHLY STATUS REPORT–PROJECT ABACUS

Description	Program ID	Assigned Date	Assigned Programmer	Priority	Completion Scheduled	Completion Actual	Remarks
CLASS I Macros	PRINØ1	1 Mar 75	SP5 Malcolm/ SFC Brown	2	1 Jun 75	30 May 75	All macros are completed except for documentation.
	PRPIØ1	"		2	"	"	
	PRMCØ1	"		2	"	"	
	PREVØ1	"		2	"	"	
	POINØ1	"		2	"	"	
	POPIØ1	"		2	"	"	
	POMCØ1	"		2	"	"	
	POEVØ1	"		2	"	"	
	UNINØ1	"		2	"	"	
	UNCIØ1	"		2	"	"	
	UNTRØ1	"		2	"	"	
	LEINØ1	"		2	"	"	
	LEMCØ1	"		2	"	"	
	LENRØ1	"		2	"	"	
	LECRØ1	"		2	"	"	
	PFEVØ1	"		2	15 Jul 75	18 Jul 75	
	PRNRØ1	"		2	"	"	
	PRCRØ1	"		2	"	"	
	PONRØ1	"		2	"	"	
	POCRØ1	"		2	"	"	
	POEVØ2	"		2	"	3 Aug 76	
	PFEVØ3	"		2	"	"	
	PRMCØ2	4 Aug 75	SFC Brown	2	11 Aug 75	6 Aug 75	
	PRNQØ2	"		2	"	"	
	PRCRØ2	"		2	"	"	
	UNSOØ1	"		2	"	"	
	UNMOØ1	20 Aug 75		2	15 Sep 75	15 Sep 75	

MONTHLY STATUS REPORT-PROJECT ABACUS

Description	Program ID	Assigned		Priority	Completion		Remarks
		Date	Programmer		Scheduled	Actual	
APPLICATIONS PROGRAMMING REPORTS							
Monthly	Ques Anal	15 May 75	SP5 Duncan	1			Analysis and Flow-charting completed. Coding started.
	Test Anal	"	"	1			"
	TAIS	"	SFC Brown	1			Analysis completed.
	Course/Task	"	"	1			"
	Course Absence	"	SP4 Zarsky	2			"
	Company Absence	"	"	2			"
Weekly	Class Roster	"	SP4 Mashey	1			Now p/o Student Registration
	Stu Actv Report	"	"				Complete
	Grad Rpt	"	"				"
	Grad Pred	"	"				"
Daily	Inactive Student	"	"				Complete except for documenta-tion.

MONTHLY STATUS REPORT-PROJECT ABACUS

| Description | Program ID | Assigned | | Priority | Completion | | Remarks |
		Date	Programmer		Scheduled	Actual	
CLASS I MACRO FORTRAN	TIME	1 Jul 75	SFC Brown	2	30 Sep 75		Complete except for documenta-tion.
	XFER	"	"	2	"		"
	EV DATA	"	"	2	"		"
	LERRTN	"	"	2	"		"
	CMNUPD	"	"	2	"		"
	CMNINI	"	"	2	"		"
	NBRCVT	"	"	2	"		"

MONTHLY STATUS REPORT—PROJECT ABACUS

Description	Program ID	Assigned Date	Programmer	Priority	Completion Scheduled	Completion Actual	Remarks
SYSTEMS PROGRAMMING							
	Update (P)			1	31 Oct 75		Update (P) and (A) combined.
	Update (A)			1	"		
	Registra-tion	3 Jun 75	SP4 Mashey	1	"		To be revised to include Class Roster
	DISREC	16 Sep 75	"	2	"		Complete except for documentation.
	LOG-ON	2 Jun 75	"	2	"		"
	LOG-OFF	3 Jun 75	"	2	"		"
	STU FILES	1 Mar 75	"	2	"		"
SYSTEMS ANALYSIS		Oct 75			Feb 76		95% complete

MONTHLY STATUS REPORT—PROJECT ABACUS

Description	Program ID	Assigned Date	Assigned Programmer	Priority	Completion Scheduled	Completion Actual	Remarks
EVALUATION							
	Baseline Data	Oct 74	Musselwhite	1	Dec 75		90% complete
	CTS Data	"	"	4	Dec 75		Reschedule to Mar 77
	Attitude Question-naires	"	"	2	Sep 76		" Feb 77
	Data Item Surveys	"	"	3	Oct 76		" Feb 77
	Data Analysis	"	"	5	Dec 76		
	Prepa-ration of Report	"	"	6	Feb 77		
	Data Reduction (on-line)	"	Zarsky		Feb 77		32% complete* *Detailed flow charts under review. Programmer required to record data incoming from the courses.

ANNEX F

ANALYSIS OF TIME SHEETS

MOS	31E	31J	35L	Total
CTS Academic Hours [1]	695.0	543.0	507.0	1,745.0
Units	139.0	269.0	194.0	602.0
Average Academic Hours Per Unit	5.0	2.0	2.6	2.9

Time Sheets,
May 74 - Jul 76

	31E	31J	35L	Total
Unit Development (hrs)	6,157.0	9,704.0	8,226.0	24,087.0
Average Time Per Unit	44.3	36.0	42.4	40.0
Editing/Debugging (hrs)	8,517.0 [2]	1,939.0	2,589.0	13,045.0
Average Time Per Unit	61.2	7.2	13.3	21.67
Total Development Hours	14,674.0 [2]	11,643.0	10,815.0	37,132.0
Average Time Per Unit	105.6	43.3	55.7	61.7

Preliminary Planning,[3] Review and Revision, Equipment Set Up, etc.				13,143.0
Total Training Development Time (courses)				50,275.0
Data Systems Division,[4] USASIGS				3,019.0
Project ABACUS Programmers, Supv Pers				5,760.0
				59,054.0

[1] Does not include COBET

[2] 31E course contains significantly more tutorial CAI than the 31J and 35L courses. 31E course was the first to use the macro system, therefore, suffered problems of testing, debugging, and modifications.

[3] Includes research, familiarization with equipment, outlining unit sequence, determining media, method and strategy for unit, and reviewing existing material.

[4] Includes training specialists, computer operators, and entry specialists.

ANNEX G

SUMMARY OF INSTRUCTOR ATTITUDES
SELF-PACED INSTRUCTION

The following is a summary of the key finding of a survey of instructor attitudes toward self-paced instruction. A similar follow-up survey will be made relative to attitude when the courses are operating under the computerized training system.

1. Activities which need most of the instructors time (ranked from most to least time).

    a. Individual counseling of students.

    b. Monitoring students.

    c. Checking student performance.

    d. Counseling students in small groups.

    e. Own enhancement.

    f. Maintenance of equipment.

    g. Guidance on use of media.

2. Instructor suggestions, preferences, and recommendations were in seven areas as noted below:

    a. Preferred classroom environment. The majority of instructors (68%) indicated their preference for the self-paced classroom.

Instructional Method	Frequency			
	31E	31J	35L	Total
Conventional (group-paced)	1	20	7	28
Self-paced	29	37	14	80
CMI/CTS	5	3	2	10
Total				118

    b. Additional training needed for instructors using the self-paced method (ranked in order of most frequent response).

    (1) No additional training required for self-paced method.

    (2) In-depth training on equipment.

    (3) Course in psychology.

    (4) Functioning in self-paced environment.

(5) Go through the course as a student.

c. Guidelines for new instructors.

(1) Know the equipment.

(2) Observe and undergo some instruction as a student.

(3) Work closely with the students.

(4) Follow the established self-paced procedures.

(5) Know the complete course.

d. An area was devoted to listing of advantages and disadvantages of self-paced instruction.

(1) The paramount advantage of self-pacing as expressed by the instructors was the ability of the student to set his own learning speed. The advantages, listed in order of importance, are as follows:

(a) Permits fast learners to proceed as fast as they are able to learn.

(b) Student can set his own pace.

(c) Hands-on training enhances learning.

(d) Instructors can spend more time with individual students.

(e) Gives slow students extra time to learn.

(f) Students are more interested and motivated.

(g) Students are better prepared. Self-pacing stimulates on-the-job experience.

(h) Students learn faster; there is no wasted time.

(i) Students learn and apply knowledge simultaneously.

(2) Disadvantages of self-paced instruction as expressed by the instructors are:

(a) No disadvantages.

(b) Need for more instructors.

(c) Instructors spend too much time with slow learners.

(d) Students do not read well; they are not qualified for self-pacing.

(e) Students fail to gain in-depth knowledge of equipment.

(f) Instructors spend too much time on the floor.

(g) Students do not benefit from questions (and answers) by other students.

e. Problems encountered using self-paced instruction (listed in order of most to least problems).

(1) Shortage of classroom instructors.

(2) No problems.

(3) Shortage of training equipment.

(4) Students are not motivated.

(5) Students do not know basic electronic theory.

(6) Students have poor reading comprehension.

(7) Instructors cannot spend enough time with individual students.

(8) Inadequate classroom equipment support maintenance.

f. The question was directed to the instructors that, "As the Director of Training, how would you improve self-paced instruction?"

Responses were as follows:

(1) Need more instructors in the classroom.

(2) Better quality students.

(3) Insure adequate training equipment in the classroom.

(4) Improve the media.

ANNEX H

SURVEY OF ACTIVITIES AND OPINIONS
REGARDING SELF-PACED INSTRUCTION

1. <u>Description:</u> The purpose of this survey was to determine the activi-
ties and opinions of the instructor staff at the US Army Signal School
(USASIGS), associated with Project ABACUS, Computerized Training System
field test, regarding the various aspects of self-paced instruction. The
finalized version of the survey contained 31 items grouped into four cate-
gories: (1) a background section consisting of nine items used to collect
information pertaining to the instructor's experience and duties; (2) an
"attitudinal" section consisting of fourteen statements relative to the
merits of self-pacing; (3) an "activities" section consisting of nineteen
statements concerning the instructors daily activities, with two supple-
mentary questions related to instructor time; and (4) a "suggestions"
section containing seven open-ended questions about the self-paced instruc-
tional process. This survey was administered to the instructor staff on
two separate occasions with eight months intervening between the initial
and final administrations. The survey may be viewed in its entirety at
Appendix A-1.

2. <u>Subjects</u>: The target group of this survey included all instructors
assigned to the: (1) Field Radio Repair Course (31E20); (2) the Tele-
typewriter Equipment Repair Course (31J20); and (3) the Avionics Communica-
tions Equipment Repair Course (35L20). One hundred and eighteen surveys
were completed as follows: 31E20 - 35; 31J20 - 60; and 35L20 - 23.
Because of the fluid personnel situation that exists in the USASIGS
operational environment, less than one third of the instructors were able

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to accomplish both initial and final surveys. The surveys were delivered to the respective courses by the USASIGS CTS project officer and the respondents completed them independently without intrusion by their supervisors. Instructor comments were encouraged.

3. Response Mode: For multiple-choice items the subject responded by checking one or more of the several alternatives as fitting. The Likert type items used the five alternative response modes and the instructors reacted to the statements by indicating levels of agreement or disagreement. Open-ended questions required short narrative answers. Instructor comments were recorded as appropriate for each item.

4. Analysis: Items one through nine on instructor background are self-explanatory and are summarized at Table A-1. Thirty-three Likert type statements comprise the attitudinal and activities portion of the survey and were scaled 1 through 5. These items have been portrayed by mean response with percentage of selection; and by gross average attitudinal score based on an assigned range of 16-80 per item. The lower score reflects a more favorable attitude toward self-pacing. Instructor comments associated with the Likert type items were summarized and incorporated in the explanation that follows. Open-ended questions in the survey evoked responses that could be reduced to terse phrases. These were consolidated for each question, showing frequency or percentages where specific views were identified. Comments and opinions were recorded with little attempt at interpretation.

5. Explanation: The instructor responses have been synthesized for pre-
sentation in this report. The results are presented in tables or summary
form in the following paragraphs with explanatory comments as appropriate.

a. Background (Part I, Items #4 through #8). Table A-1 contains the
summarized responses on the instructor backgrounds. Item #8a of this
section was omitted as the computer system was not fully operational when
the surveys were completed. Item #9 pertains primarily to CTS instructional
programmers and responses by the regular staff instructors provided no
input to this item; it was also deleted.

b. Attitudinal Data (Part II, Items #1 through #14). Instructor
responses to attitudinal statements are protrayed by mean response with
percentage of selection at Tables A-2 through A-7. Instructor comments
concerning attitudinal statements were exceedingly sparse, however, state-
ments with summarized comments follow:

Part II Attitudes – statements	Summary of Instructor Comments
I feel the majority of the students met the objective of the course using this method of instruction.	90% meet the objectives. Many do; many take too long. Performance testing proves this. Ability demonstrated in final shop. Don't think much learning takes place. Some not qualified to enter.
This method of instruction is not an effective way to instruct this course.	Not for caliber student received. Best method for hands-on training. Need more conference classes on equipment and troubleshooting. Is an effective method. Lock-step far superior method. Too many instructors required.

Examinations adequately evaluate students on achievement of training objectives.

Most effective.
Very practical.

Examination procedure is inconvenient and takes too much time.

Good way to test students ability.

It takes an experienced instructor to manage this type of instruction.

Experience with equipment – not with instruction.

The students' attitudes toward the course are very favorable.

Good students like it; the poor students do not.
Students feel they don't learn much.

The students are very enthusiastic about the course.

Most feel course a real challenge.
Some lazy; don't care.
Most students enthusiastic
Some are and some are not
Most enthusiastic students in several years of instruction.

c. Attitudinal Scales. In addition to portraying the Likert type attitudinal statements by mean response and percentage of selection, the responses of the instructors were summed and averaged to yield an attitude score for each response set based on a linear scale of 16 to 80. The lower score indicating a more favorable attitude.

(1) Instructor Attitudes. All instructors – N = 118

41.5

| 16 | 32 | 48 | 64 | 80 |
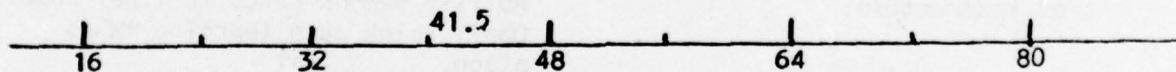
Average score for all responses was 41.5 which indicates a slightly favorable attitude toward self-paced instruction.

(2) Instructor Attitudes. 31E20 instructors; initial and final.

(a) Initial:

41.1

| 16 | 32 | 48 | 64 | 80 |
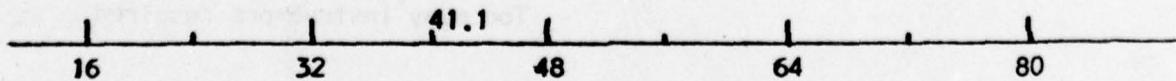
Average score for 31E20 initial survey (N = 17) was 41.1.

(b) Final:

40.5

16   32   48   64   80
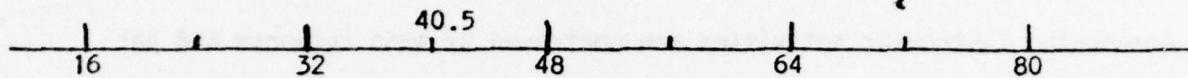
Average score for 31E20 Final Survey (N = 18) was 40.5

(c) The variance of .6 of one point in attitude from the initial to final survey for the 31E20 course is not considered significant when employing a summated rating scale.

(3) Instructor Attitudes. 31J20 instructors; initial and final.

(a) Initial:

42.4

16   32   48   64   80
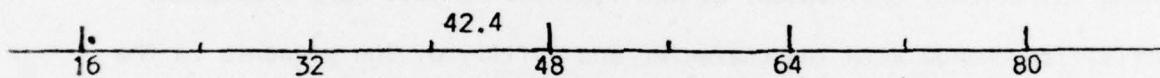
Average score for 31J20 initial survey (N = 29) was 42.4

(b) Final:

43.0

16   32   48   64   80
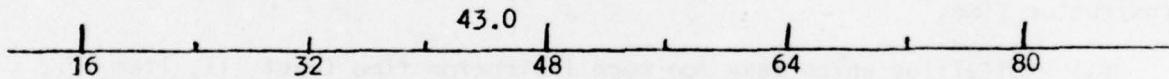
Average score for 31J20 final survey (N = 31) was 43.0

(c) Variance of .6 of one point on the summated scale reflects a slight shift toward a less favorable attitude toward self-paced instruction. This shift is not considered to be of sufficient magnitude on the summated scale to convey an attitudinal change.

(4) Instructor Attitudes. 35L20 instructors.

39.3

16   32   48   64   80
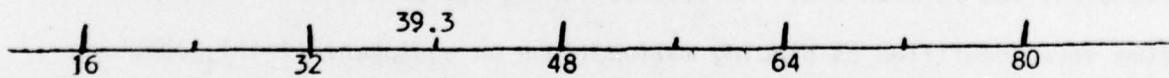
The 35L20 course instructor responses indicated the most favorable attitude toward self-paced instruction. Average score for 35L20 instructors was 39.3. Only 23 instructors completed the survey (7 initial, 17 final) and they have been treated as a single entity.

d.   Instructor Activities (Part III, Item #1). Statements (a through s) concerning instructor activities are portrayed by mean response and percentage of selection, and are displayed at Tables A-8 through A-13. Slight changes in the amount of time devoted to various activities performed by instructors were noted when comparing initial and final surveys for the 31E20 and 31J20 courses. No firm conclusions can be drawn concerning these changes as the surveys reflect the conditions that existed in an ongoing operational environment at the time the surveys were completed. Activities change with the character and ability of the students in the respective courses within any given time phase. Item 1, statement "t" listed "company" or "unit" duties as the other activity demanding the most instructor time.

(1) Activities which take too much instructor time (Part III, Item #2). Instructor responses included letter designations of activity statements listed in Part III, Item #1, plus their spontaneous comments. In summarizing the results, the statements and comments have been reduced to concise phrases with frequency of response cited; the selection of more than one statement was permissible. Activities taking too much of the instructors time were identified as placing malfunctions on equipment (f=19), checking student performance (f=11), maintaining student records (f=16), repairing faulty equipment (f-13), and individually counseling students (f=13). Other activities mentioned were basic electronics not learned prior to entering course, counseling students (career guidance), giving guidance on use of media, and administrative duties. The largest group of instructors

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(f=34) indicated that no specific activities utilized too much of their time as all activities listed were considered part of their job (Item #1, statement "t" indicated that "company" or "unit" duties as the other activity demanding the most instructor time.

(2) Activities which need more of the instructors' time (Part III, Item #3). Instructor responses have been reduced to concise phrases with response cited as above. Individual counseling of students (f-46), monitoring students (f=23), counseling students in small groups (f=11), checking student performance (f=12), maintenance of equipment (f=9), guidance on use of media (f=8), own enhancement (f=11). Other activities mentioned included administering tests, and placing malfunctions on equipment. Seventeen instructors indicated that no activities needed more of their time.

e. Instructor Suggestions (Part IV, Items #1 through #7). A total of seven items comprised this portion of the survey. Except for Item #1, responses to these items were sporatic. Some were left blank. Those comments recorded have been reduced to concise statements with frequency of response indicated where appropriate.

(1) Preferred classroom environment. The majority (68%) of the instructors indicated their preference for the self-paced classroom.

Instructional Method	Frequency			
	31E20	31J20	35L20	Total
Conventional (group-paced)	1	20	7	28
Self-paced	29	37	14	80
CMI/CTS	5	3	2	10
Other _____				____
Total				118

(2) Additional training needed for instructors using self-paced method. Several respondents did not complete this item which may reflect the theme of the most frequent response - that no additional training is required for the self-paced method (f=37). The need for additional training included in-depth training on equipment (f=21), course in psychology (f=13), functioning in self-paced environment (f=10), more electronic theory (f=5), in-depth knowledge of test equipment (f=5), go through the course as a student (f=7), and the employment of media devices (f=4).

(3) Guidelines for new instructors. The primary guidelines given for the new instructor included - know the equipment (f=36), observe and undergo some instruction as a student (f=20), and work closely with the students (f=19). Others mentioned were know trouble-shooting procedures (f=3), follow the established self-paced learning procedures (f=8), and know the complete course (f=8).

(4) Advantages of self-paced instruction. The ability of the student to set his own learning speed appeared to be the paramount advantage of self-pacing as expressed by the instructors. The summarization of instructor responses with frequency of occurrences follows. Permits fast learners to proceed as fast as they can learn (f=28), student can set his own pace (f-21), hands-on training enhances learning (f=17), instructors can spend more time with individual students (f=16), gives slow students extra time to learn (f=13), students more interested and motivated (f=13), students better prepared, simulates on-the-job experience (f=12), students learn faster, no wasted time (f=9), students learn and apply knowledge simultaneously (f=8), all students get all the instruction (f=4), students more

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proficient because exposed to malfunctions (f=3), and better instructor utilization and motivation (f=4).

(5) Disadvantages of self-paced instruction. No disadvantages (f=21) and need for more instructors (f=21) head the list of instructor responses concerning disadvantages of self-paced instruction. Other disadvantages expressed by the instructors included - instructors spend too much of their time with slow learners (f=12), students do not read well, not qualified for self-pacing (f=11), students fail to gain in-depth knowledge of equipment (f=9), instructors must spend too much time on the floor (f=6), students do not benefit from questions (and answers) by other students (f=6), lack of qualified instructors (f=6), students take more time than they need (f=4), students unable to develop transfer knowledge to like equipment (f=3), some marginal students get through (f=5), more destructive to equipment (f=3) and too much emphasis on the progression index (P.I.).

(6) Problems encountered using self-paced instruction. Heading the list of problems as expressed by the instructors was the shortage of classroom instructors (f=22), followed closely by the comment that no problems exist using this method (f=16). Other problems cited were shortage of training equipment (f-14), students not motivated (f=11), students do not know basic electronic theory (f=10), poor reading comprehension (f=10), can't spend enough time with individual students (f=6), inadequate classroom equipment support maintenance (f=6), students develop little transfer knowledge (f=4), group inputs to self-paced courses should be eliminated (f=3), students do not learn equipment in-depth (f=4), deliberate slow down and boredom.

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(7) **As Director of Training, how would you improve self-paced instruc-**
tion? The thought that appeared to be foremost, when the instructors

suggested improvement to self-pacing, was the need for more instructors

in the classroom (f=21), followed by try for better quality students (f=14),

and insure adequate training equipment in the classroom (f=13). Other

comments included - no changes necessary (f=9), upgrade the instructor

staff (f=11), improve the media (f=10), add some conventional (group-paced)

instruction (f=9), keep instructors on the floor, not on other activities

(f=5), arrange early out for non-learners (f=5), permit higher attrition

rate (f=4), require instructors to study psychology (f=3), establish

reading comprehension classes for students (f=3), visit classrooms more

often (f=3), and include some written tests (f=2).

TABLE -1
INSTRUCTOR BACKGROUNDS

		Self-Paced Courses		
		31E20	31J20	35L20
1.	Instructor Experience:			
	a. Months (average) instructor experience.	25.4	33.4	25.7
	b. Prior Instructor Positions.			
	(1) Conventional (group-paced)	74%	70%	91%
	(2) Self-paced*	17%	37%	9%
	(3) CTS/CMI		1%	
	(4) No prior experience.	23%	14%	4%
2.	Duties "other" than classroom instructor:			
	a. Yes	41%	48%	61%
	b. No	59%	52%	39%
3.	Time spent on "other" duties:			
	a. Less than one-fourth	50%	34%	36%
	b. One-fourth to one-half	40%	21%	29%
	c. One-half to three-fourths	10%	7%	14%
	d. More than three-fourths		38%	21%
4.	"Other" duties consist of:			
	a. Writing lesson plans	15%	14%	15%
	b. Preparing self-paced material	38%	26%	18%
	c. Training other instructors	23%	14%	24%
	d. Systems engineering course		12%	6%
	e. Coordinating other activities	8%	2%	
	f. Preparing Instructional Materials for CTS		14%	6%
	g. Unit (other) duties	16%	18%	31%

*Occupied both conventional and self-paced positions.

TABLE A-2
INSTRUCTOR ATTITUDES - SELF-PACED INSTRUCTION

PART II ATTITUDES All Instructors II=118 Mean Response with Percent Selection	Mean*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I feel the majority of the students met the objectives of the course using this method of instruction. (Up to this point)	2.15	21	53	17	08	01
2. This method of instruction is <u>not</u> an effective way to instruct this course.	3.95	01	12	10	45	32
3. The following examinations adequately evaluate students on the achievement of training objectives.						
a. Annex or Objective type	2.46	09	40	46	03	02
b. Lesson, Evaluation Point or Problem type	2.26	14	53	27	04	02
4. The examination procedure is inconvenient and takes too much time.						
a. Annex or Objective type	3.50	02	06	43	39	10
b. Lesson, Evaluation Point or Problem type	3.87	02	06	30	47	15
5. This method of instruction is a valuable teaching procedure.	1.99	24	58	14	04	
6. It takes an experienced instructor to manage this type of instruction.	1.97	43	36	07	09	05
7. Students' attitudes toward the course are very favorable.	2.33	14	51	25	09	01
8. Students use too much time learning to operate instructional equipment.	3.75	02	06	19	59	14
9. Students appear to be very interested in the course content.	2.90	14	52	22	10	02
10. Students are very enthusiastic about the course.	2.47	13	44	29	12	02
11. Students tend to study less as the instruction progresses.	3.15	03	28	23	42	04
12. I have no difficulty answering students' questions.	1.85	31	58	06	04	01
13. Good rapport has been established with students.	1.83	25	68	07		
14. I use my instructor time more efficiently in this method of instruction.	2.30	22	44	19	12	03

*When "strongly agree" = 1; "agree" = 2; "neutral" = 3; "disagree" = 4; "strongly disagree" = 5.

TABLE A-3

INSTRUCTOR ATTITUDES - SELF-PACED INSTRUCTION

PART II ATTITUDES 31E20 Initial N=17 Mean Response with Percent Selection	Mean*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I feel the majority of the students met the objectives of the course using this method of instruction. (Up to this point)	1.65	41	53	06		
2. This method of instruction is not an effective way to instruct this course.	4.59				41	59
3. The following examinations adequately evaluate students on the achievement of training objectives.						
a. Annex or Objective type	2.65	20	80			
b. Lesson, Evaluation Point or Problem type	2.06	21	72	07		
4. The examination procedure is inconvenient and takes too much time.						
a. Annex or Objective type	3.53			14	43	43
b. Lesson, Evaluation Point or Problem type	3.88		07	07	57	29
5. This method of instruction is a valuable teaching procedure.	1.47	44	56			
6. It takes an experienced instructor to manage this type of instruction.	1.47	65	29		06	
7. Students' attitudes toward the course are very favorable.	2.00	29	47	18	06	
8. Students use too much time learning to operate instructional equipment.	4.00			12	76	12
9. Students appear to be very interested in the course content.	2.00	23	59	12	06	
10. Students are very enthusiastic about the course.	2.18	23	47	18	12	
11. Students tend to study less as the instruction progresses.	3.94		06	12	70	12
12. I have no difficulty answering students' questions.	2.05	24	64		06	06
13. Good rapport has been established with students.	1.76	19	75	06		
14. I use my instructor time more efficiently in this method of instruction.	1.94	29	59	06		06

*When "strongly agree" = 1; "agree" = 2; "neutral" = 3; "disagree" = 4; "strongly disagree" = 5.

TABLE A-4
INSTRUCTOR ATTITUDES - SELF-PACED INSTRUCTION

PART II ATTITUDES 31E20 Final N=18 Mean Response with Percent Selection	Mean*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I feel the majority of the students met the objectives of the course using this method of instruction. (Up to this point)	2.27	11	56	28	05	
2. This method of instruction is <u>not</u> an effective way to instruct this course.	4.38			06	50	44
3. The following examinations adequately evaluate students on the achievement of training objectives. a. Annex or Objective type	2.61	15	46	23	08	08
b. Lesson, Evaluation Point or Problem type	2.44	17	58	17	08	
4. The examination procedure is inconvenient and takes too much time. a. Annex or Objective type	3.27		17	08	67	08
b. Lesson, Evaluation Point or Problem type	3.61		07	22	57	14
5. This method of instruction is a valuable teaching procedure.	1.77	33	56	11		
6. It takes an experienced instructor to manage this type of instruction.	1.72	55	28	06	11	
7. Students' attitudes toward the course are very favorable.	2.55	05	50	28	17	
8. Students use too much time learning to operate instructional equipment.	3.61		17	05	56	22
9. Students appear to be very interested in the course content.	2.83	06	50	33	11	
10. Students are very enthusiastic about the course.	2.39	06	47	35	12	
11. Students tend to study less as the instruction progresses.	2.89		33	28	33	06
12. I have no difficulty answering students' questions.	1.94	39	44	17		
13. Good rapport has been established with students.	1.89	22	67	11		
14. I use my instructor time more efficiently in this method of instruction.	1.89	33	50	11	06	

*When "strongly agree" = 1; "agree" = 2; "neutral" = 3; "disagree" = 4; "strongly disagree" = 5.

TABLE A-5

INSTRUCTOR ATTITUDES – SELF-PACED INSTRUCTION

PART II ATTITUDES 31J20 Initial N=29 Mean Response with Percent Selection	Mean*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I feel the majority of the students met the objectives of the course using this method of instruction. (Up to this point)	2.24	17	52	21	10	
2. This method of instruction is <u>not</u> an effective way to instruct this course.	3.65		27	07	38	28
3. The following examinations adequately evaluate students on the achievement of training objectives. a. Annex or Objective type	2.48	07	42	48	03	
b. Lesson, Evaluation Point or Problem type	2.31	10	59	24	03	04
4. The examination procedure is inconvenient and takes too much time. a. Annex or Objective type	3.13	04	07	45	34	10
b. Lesson, Evaluation Point or Problem type	3.75		03	38	38	21
5. This method of instruction is a valuable teaching procedure.	2.03	21	59	17	03	
6. It takes an experienced instructor to manage this type of instruction.	2.20	28	45	10	14	03
7. Students' attitudes toward the course are very favorable.	2.72		48	34	14	04
8. Students use too much time learning to operate instructional equipment.	3.58		14	14	58	14
9. Students appear to be very interested in the course content.	2.58	07	52	24	10	07
10. Students are very enthusiastic about the course.	2.79	07	41	24	21	07
11. Students tend to study less as the instruction progresses.	2.96	07	41	07	38	07
12. I have no difficulty answering students' questions.	1.76	28	69	03		
13. Good rapport has been established with students.	1.72	28	72			
14. I use my instructor time more efficiently in this method of instruction.	2.48	21	34	28	14	03

*When "strongly agree" = 1; "agree" = 2; "neutral" = 3; "disagree" = 4; "strongly disagree" = 5.

TABLE A-6

INSTRUCTOR ATTITUDES - SELF-PACED INSTRUCTION

PART II ATTITUDES 31J20 Final N=31 Mean Response with Percent Selection	Mean*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I feel the majority of the students met the objectives of the course using this method of instruction. (Up to this point)	2.48	16	42	23	16	03
2. This method of instruction is <u>not</u> an effective way to instruct this course.	3.51	10	13	23	51	03
3. The following examinations adequately evaluate students on the achievement of training objectives.						
a. Annex or Objective type	2.50	06	52	36	03	03
b. Lesson, Evaluation Point or Problem type	2.48	10	51	26	10	03
4. The examination procedure is inconvenient and takes too much time.						
a. Annex or Objective type	3.39	03	10	29	55	03
b. Lesson, Evaluation Point or Problem type	3.45	04	06	26	58	06
5. This method of instruction is a valuable teaching procedure.	2.39	10	55	22	13	
6. It takes an experienced instructor to manage this type of instruction.	2.68	19	39	13	13	16
7. Students' attitudes toward the course are very favorable.	2.58	03	48	36	13	
8. Students use too much time learning to operate instructional equipment.	3.51		03	33	61	03
9. Students appear to be very interested in the course content.	2.48	03	61	23	10	03
10. Students are very enthusiastic about the course.	2.68	03	45	36	13	03
11. Students tend to study less as the instruction progresses.	3.05	07	32	29	32	
12. I have no difficulty answering students' questions.	1.77	39	48	10	03	
13. Good rapport has been established with students.	1.90	23	61	16		
14. I use my instructor time more efficiently in this method of instruction.	2.48	16	42	26	10	07

*When "strongly agree" = 1; "agree" = 2; "neutral" = 3; "disagree" = 4; "strongly disagree" = 5.

TABLE A-7
INSTRUCTOR ATTITUDES – SELF-PACED INSTRUCTION

PART II ATTITUDES   35L20   Total   N-23

Mean Response with Percent Selection	Mean*	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I feel the majority of the students met the objectives of the course using this method of instruction. (Up to this point)	1.78	26	65	05	04	
2. This method of instruction is not an effective way to instruct this course.	4.13		08	09	44	39
3. The following examinations adequately evaluate students on the achievement of training objectives.						
a. Annex or Objective type	2.17	17	44	39		
b. Lesson, Evaluation Point or Problem type	1.95	26	52	22		
4. The examination procedure is inconvenient and takes too much time.						
a. Annex or Objective type	3.56	04		48	31	17
b. Lesson, Evaluation Point or Problem type	3.73		13	21	44	22
5. This method of instruction is a valuable teaching procedure.	1.82	26	65	09		
6. It takes an experienced instructor to manage this type of instruction.	1.30	70	30			
7. Students' attitudes toward the course are very favorable.	1.69	35	61	04		
8. Students use too much time learning to operate instructional equipment.	4.80	04		09	57	30
9. Students appear to be very interested in the course content.	1.82	34	49	17		
10. Students are very enthusiastic about the course.	1.95	30	44	26		
11. Students tend to study less as the instruction progresses.	3.26		17	39	44	
12. I have no difficulty answering students' questions.	1.85	26	61	13		
13. Good rapport has been established with students.	1.69	30	70			
14. I use my instructor time more efficiently in this method of instruction.	2.47	18	44	13	25	

*When "strongly agree" = 1; "agree" = 2; "neutral" = 3; "disagree" = 4; "strongly disagree" = 5.

TABLE A-8

INSTRUCTOR ACTIVITIES - SELF-PACED INSTRUCTION

PART III ACTIVITIES All Instructors N=118 Mean Response with Percent Selection	Mean*	More than Half	Substantial Amount	Fair Amount	Very Little	None
a. Monitoring students	3.66	23	36	31	06	04
b. Individually counseling students on lesson material.	3.56	17	39	30	13	01
c. Counseling students in small groups on lesson material.	2.35		14	25	43	18
d. Administering tests.	2.09	02	10	22	28	38
e. Giving direction on performance exercises.	2.97	06	25	36	25	08
f. Maintaining student records.	2.70	.04	17	34	35	10
g. Putting malfunctions in equipment for performance exercises.	3.74	26	37	26	08	03
h. Checking questions, performance problems, or exams.	3.40	13	35	36	13	03
i. Preventive maintenance on equipment.	2.83	03	23	38	30	06
j. Repairing faulty equipment.	2.84	09	20	29	32	10
k. Reviewing students' records.	2.39	01	09	32	43	15
l. Setting up and giving guidance on use of instructional media.	2.45		15	27	45	13
m. Counseling students on matters other than lesson material. (Career guidance)	2.27		06	26	58	10
n. Recording instructor comments about students.	2.02		04	19	53	24
o. Faculty board meeting.	1.19			02	16	82
p. Interaction with other instructors.	2.44	01	14	28	42	15
q. Administrative duties.	1.93	02	04	15	44	35
r. Preparing for classroom instruction.	2.55	03	10	39	36	12
s. Own enhancement.	2.63	03	22	30	25	20

*When "more than half" = 5; "substantial amount" = 4; "fair amount" = 3;
"very little" = 2; "none" = 1

TABLE A-9

INSTRUCTOR ACTIVITIES – SELF-PACED INSTRUCTION

PART III ACTIVITIES 31E20 Initial N=17 Mean Response with Percent Selection	Mean*	More than Half	Substantial Amount	Fair Amount	Very Little	None
a. Monitoring students	3.80	13	67	06	14	
b. Individually counseling students on lesson material.	3.76		23	47	12	18
c. Counseling students in small groups on lesson material.	2.56		25	19	44	12
d. Administering tests.	1.17			13	06	81
e. Giving direction on performance exercises.	3.06	06	31	25	38	
f. Maintaining student records.	2.88	.06	12	47	35	
g. Putting malfunctions in equipment for performance exercises.	3.70		12	30	35	23
h. Checking questions, performance problems, or exams.	3.29	12	23	47	18	
i. Preventive maintenance on equipment.	2.94		24	53	17	06
j. Repairing faulty equipment.	2.47	05	12	18	53	12
k. Reviewing students' records.	2.65	06	12	29	47	06
l. Setting up and giving guidance on use of instructional media.	2.82		29	35	24	12
m. Counseling students on matters other than lesson material. (Career guidance)	2.23			35	53	12
n. Recording instructor comments about students.	2.05			29	47	24
o. Faculty board meeting.	1.17				18	82
p. Interaction with other instructors.	2.62		24	29	24	23
q. Administrative duties.	1.87		06	18	29	47
r. Preparing for classroom instruction.	2.81	06	06	53	24	11
s. Own enhancement.	3.06	05	24	41	06	24

*When "more than half" = 5; "substantial amount" = 4; "fair amount" = 3; "very little" = 2; "none" = 1

TABLE A-10

INSTRUCTOR ACTIVITIES - SELF-PACED INSTRUCTION

PART III ACTIVITIES 31E20 Final N=18 Mean Response with Percent Selection	Mean*	More than Half	Substantial Amount	Fair Amount	Very Little	None
a. Monitoring students	4.11	39	39	17	05	
b. Individually counseling students on lesson material.	3.44	05	50	28	17	
c. Counseling students in small groups on lesson material.	2.61		17	44	22	17
d. Administering tests.	1.50		06	05	22	67
e. Giving direction on performance exercises.	3.11	06	33	39	11	11
f. Maintaining student records.	2.66	06	11	39	33	11
g. Putting malfunctions in equipment for performance exercises.	3.50	11	39	39	11	
h. Checking questions, performance problems, or exams.	3.22	11	28	33	28	
i. Preventive maintenance on equipment.	2.61		24	35	35	06
j. Repairing faulty equipment.	2.16		06	28	44	22
k. Reviewing students' records.	2.39		06	44	33	17
l. Setting up and giving guidance on use of instructional media.	1.66		06	47	24	23
m. Counseling students on matters other than lesson material. (Career guidance)	2.39		11	22	61	06
n. Recording instructor comments about students.	2.05		06	22	44	28
o. Faculty board meeting.	1.27				28	72
p. Interaction with other instructors.	2.72		17	44	33	06
q. Administrative duties.	2.00				22	56	22
r. Preparing for classroom instruction.	2.44		11	33	45	11
s. Own enhancement.	2.44		28	28	11	33

*When "more than half" = 5; "substantial amount" = 4; "fair amount" = 3; "very little" = 2; "none" = 1

INSTRUCTOR ACTIVITIES - SELF-PACED INSTRUCTION

PART III ACTIVITIES 31J20 Initial N=29 Mean Response with Percent Selection	Mean*	More than Half	Substantial Amount	Fair Amount	Very Little	None
a. Monitoring students	3.69	24	28	41	07	
b. Individually counseling students on lesson material.	3.55	21	31	35	10	03
c. Counseling students in small groups on lesson material.	2.48		17	25	48	10
d. Administering tests.	2.17		17	21	27	35
e. Giving direction on performance exercises.	2.76	04	28	41	17	10
f. Maintaining student records.	2.55	04	10	41	28	17
g. Putting malfunctions in equipment for performance exercises.	4.17	41	38	17	04	
h. Checking questions, performance problems, or exams.	3.65		07	52	41	
i. Preventive maintenance on equipment.	3.00		07	24	38	31
j. Repairing faulty equipment.	3.17	10	28	34	24	04
k. Reviewing students' records.	2.17		07	24	48	21
l. Setting up and giving guidance on use of instructional media.	2.58		14	41	35	10
m. Counseling students on matters other than lesson material. (Career guidance)	2.51		10	42	38	10
n. Recording instructor comments about students.	1.96		04	17	52	27
o. Faculty board meeting.	1.17				17	83
p. Interaction with other instructors.	2.27		10	24	48	18
q. Administrative duties.	2.20	07	04	14	48	27
r. Preparing for classroom instruction.	2.55	07	07	38	31	17
s. Own enhancement.	2.48	04	10	38	28	20

*When "more than half" = 5; "substantial amount" = 4; "fair amount" = 3;
"very little" = 2; "none" = 1

TABLE A-12

INSTRUCTOR ACTIVITIES - SELF-PACED INSTRUCTION

PART III ACTIVITIES 31J20 Final N=31 Mean Response with Percent Selection	Mean*	More than Half	Substantial Amount	Fair Amount	Very Little	None
a. Monitoring students	3.48	13	32	49	03	04
b. Individually counseling students on lesson material.	3.74	22	39	29	10	
c. Counseling students in small groups on lesson material.	2.48		13	29	48	10
d. Administering tests.	2.29	06	10	16	42	26
e. Giving direction on performance exercises.	3.00	09	26	32	26	07
f. Maintaining student records.	2.54	.07	13	19	52	09
g. Putting malfunctions in equipment for performance exercises.	3.74	32	29	26	06	07
h. Checking questions, performance problems, or exams.	3.38	19	26	36	13	06
i. Preventive maintenance on equipment.	2.83	03	26	29	36	06
j. Repairing faulty equipment.	3.54	20	32	32	16	
k. Reviewing students' records.	2.35		10	32	42	16
l. Setting up and giving guidance on use of instructional media.	2.58		23	16	58	03
m. Counseling students on matters other than lesson material. (Career guidance)	2.19		06	16	68	10
n. Recording instructor comments about students.	1.83	03	10	55	32	
o. Faculty board meeting.	1.19	06	07	87		
p. Interaction with other instructors.	2.48	03	13	29	39	16
q. Administrative duties.	1.70		03	13	39	45
r. Preparing for classroom instruction.	2.61		09	52	29	10
s. Own enhancement.	2.77		36	19	32	13

*When "more than half" = 5; "substantial amount" = 4; "fair amount" = 3; "very little" = 2; "none" = 1

TABLE A-13

INSTRUCTOR ACTIVITIES - SELF-PACED INSTRUCTION

PART III ACTIVITIES 35L20 Total N=23 Mean Response with Percent Selection	Mean*	More than Half	Substantial Amount	Fair Amount	Very Little	None
a. Monitoring students	3.73	30	30	26	10	04
b. Individually counseling students on lesson material.	3.30	09	35	39	13	04
c. Counseling students in small groups on lesson material.	1.87		04	09	48	39
d. Administering tests.	1.83		13	52	31	04
e. Giving direction on performance exercises.	2.34	04	13	44	35	04
f. Maintaining student records.	3.17	.39	39	22		
g. Putting malfunctions in equipment for performance exercises.	3.52	09	48	26	13	04
h. Checking questions, performance problems, or exams.	3.52	13	39	31	13	04
i. Preventive maintenance on equipment.	2.73	04	17	40	26	13
j. Repairing faulty equipment.	2.30		13	26	39	22
k. Reviewing students' records.	2.60		13	39	44	04
l. Setting up and giving guidance on use of instructional media.	2.04		04	09	74	13
m. Counseling students on matters other than lesson material. (Career guidance)	1.57			13	74	13
n. Recording instructor comments about students.	2.30		09	22	61	08
o. Faculty board meeting.	1.17			.	18	82
p. Interaction with other instructors.	2.74		13	22	56	09
q. Administrative duties.	2.04		04	22	48	26
r. Preparing for classroom instruction.	2.43		17	17	57	09
s. Own enhancement.	2.60	09	13	26	35	17

*When "more than half" = 5; "substantial amount" = 4; "fair amount" = 3;
"very little" = 2; "none" = 1

ANNEX I

COMMUNICATIVE TECHNOLOGY DIRECTORATE
US ARMY TRAINING SUPPORT CENTER
FORT EUSTIS, VIRGINIA 23604

PUBLICATIONS

TITLE	CTS-TR#	DDC#
A Feasiblity Study of Computer Assisted Instruction in US Army Basic Electronics Training. Feb 68	(None)	AD 745 402
The Implementation of Computer Assisted Instruction in US Army Basic Electronics Training. Sep 69	TR-69-1	AD 704 339
Audio Utilization Conventions and Techniques for Computer Assisted Instruction. Mar 70	TR-70-1	AD 704 338
An Automated Student Registration Procedure (REGIS). Jun 70	TR-70-2	AD 710 983
A MACRO System for Computer Assisted Instruction. May 70	TR-70-3	(None)
Application of Computers to Training. Apr 71	TR-71-1	AD 749 468
An Instructional Model for Computer Assisted Instruction. May 71	TR-71-2	AD 745 409
Instructional Programming Guide for Computer Assisted Instruction. Jul 71	TR-71-3	AD 749 469
Task Group Report: CAI Volumes I & II. Apr 72	(None)	(None)
A Summative Evaluation of Computer Assisted Instruction in US Army Basic Electronics Training. May 72	TR-72-1	AD 749 470
Vacuum Tube/Solid State Circuit Survey. Mar 73	CTS-TR-73-1	AD 759 129

TITLE	CTS-TR#	DDC#
CLASS I Language: Document A (Specif. No: S-125-72). Apr 73	(None)	(None)
Record Formats: Booklet A (Specif. No: S-125-72). Apr 73	(None)	(None)
Concept Plan: Booklet B (Specif. No: S-125-72). Apr 73	(None)	(None)
Estimated System Use Factors: Document C. (Specif. No: S-125-72) Apr 73	(None)	(None)
Preliminary Instructional Model for a Computerized Training System. Jul 73	CTS-TR-73-2	AD 762 180
An On-Line Electronics Graphics Symbol Set for the PLATO IV System. Oct 73	CTS-TR-73-3	AD 776 364
One Year Status Report Computerized Training System: Project ABACUS. Aug 73	CTS-TR-73-4	AD 777 767
Preliminary Evaluation Plan for US Army Computerized Training System. Jan 74	CTS-TR-74-1	AD 777 783
PLATO IV First Year Report Computerized Training System. Apr 74	CTS-TR-74-2	(None)
Survey of Computer Applications in Army Training. Aug 74	CTS-TR-74-3	AD 787 429
Second Year Status Report Computerized Training Systems Project ABACUS. Aug 74	CTS-TR-74-4	(None)
Effective Writing for a Computerized Training System. Jan 75	CTS-TR-75-1	(None)
Computer Applications in Army Training Present Status and Planned Activity. Apr 75	(None)	(None)
Instructional Effectiveness of the PLATO IV Plasma Terminal. May 75	CTS-TR-75-2	(None)
The Future of the Computer in Army Training. May 75	CTS-TR-75-3	(None)

TITLE	CTS-TR #	DDC #
Third Year Status Report Computerized Training Systems Project ABACUS. Aug 75	CTSD-TR-75-4	
Project ABACUS Handbook on Program Documentation and Debugging. Feb 76	CTSD-TR-76-1	